

# DATA PROCESSING

VOLUME 8

List of contents and subject index for 1966

The list of Contents gives the page numbers, titles and synopses of articles published during 1966. An item in the Subject Index is cross-referenced to the list of Contents by the number of the page in which the reference appears. For example, the item "Miracode system" is stated in the Subject Index to appear on page 42; reference to the Contents shows that page 42 is in the article entitled "Microfilm—the efficient way to handle output data."

FOR TOP MANAGEMENT AND CHIEF EXECUTIVES

# CONTENTS FOR 1966

---

## NUMBER 1 JANUARY-FEBRUARY

<b>Industrial and commercial simulation</b>	2
factors which influence the planning of a simulation project	
<b>A computer for the company that cares</b>	6
a London laundry uses a computer for clerical purposes	
<b>Computers and Government</b>	12
<b>Cost analysis on punched cards</b>	14
I.C.T. 80-column punched card equipment is used by a manufacturing firm	
<b>New computers for industrial automation</b>	23
<b>Preparing more invoices at less cost</b>	24
keyboard equipment for the smaller business	
<b>Data processing topics</b>	28
comments on new equipment and applications	
<b>Microfilm—the efficient way to handle output data</b>	38
the S-C 4400 document recorder and the Miracode system constitute an effective method of retrieving information	
<b>I.C.T. 1900 Series</b>	44
description of a range of eight compatible computers	
<b>Clearing half a million cheques a day</b>	54
procedures adopted by the Westminster Bank	

## NUMBER 2 MARCH-APRIL

<b>Computer control of a blood bank</b>	64
an IBM 7094 computer serves 29 hospitals in California	
<b>What is Software?</b>	69
introduction to an important aspect of computer technology	
<b>Atlas General Survey Program</b>	74
a development which simplifies the processing of survey data	
<b>Integrated control in the process industries</b>	78
commercial as well as technical criteria can now be used for control purposes	
<b>Reliability assessed by computer</b>	88
how I.C.T. test the performance of their equipment	
<b>Hire purchase accounting at Southern Gas</b>	90
data processing methods adopted by a public utility	
<b>Training tomorrow's experts</b>	99
<b>Data processing topics</b>	100
comments on new equipment and applications	
<b>Solving the name and address problem</b>	110
procedures employed by the "Reader's Digest"	
<b>Compatibles/400</b>	112
a range of computers marketed in Britain by De La Rue Bull	

## NUMBER 3      MAY-JUNE

<b>Computer assisted production control</b> an NCR 315 computer provides a vehicle manufacturer with essential management information	124
<b>Big business for a small installation</b> hire purchase accounting with punched card equipment	134
<b>Language H</b> a simple programming language for commercial use	137
<b>An electronic accounting machine from Remington Rand</b> description of the Miniputer—an inexpensive billing machine	140
<b>Data processing topics</b> comments on new equipment and applications	144
<b>Order handling at Laport Chemicals</b> sales ordering and accounting procedures using Flexowriters and a 1004 data processor	154
<b>Instant information for the investor</b> a financial information service based on a real time computer system	164
<b>Toward integration</b> factors affecting the development of integrated data processing systems	176

## NUMBER 4      JULY-AUGUST

<b>Inter-Loc—a real time management control system</b> a computer-based method of corporate control is being established by Lockheed in the United States	184
<b>Check digit verification</b> an efficient method of checking the validity of input data	194
<b>MOP—multiple on-line programming system</b> a supervisory program for use with the larger computers of the I.C.T. 1900 series	202
<b>Bureau with a difference</b> random access storage facilities are available at a new computer bureau	207
<b>Data processing topics</b> comments on new equipment and applications	210
<b>New solution to an old problem</b> operational research techniques are being used to plan the re-organisation of a bus service	220
<b>Order scheduling and control in the steel industry</b> procedures adopted by Richard Thomas & Baldwins	225
<b>The role of the computer consultant</b>	232
<b>Elliott 900 Series</b> a range of small computers for military, commercial and industrial applications	236

## NUMBER 5      SEPTEMBER-OCTOBER

<b>Programma 101</b> a desk-top computing device introduced by Olivetti	244
<b>Pert/Cost—a planning technique for higher management</b>	250
<b>Reading computer input data automatically</b> a universal document reader has been developed by I.C.T.	259
<b>Computer controlled display system</b>	260
<b>A German computer for the British market</b> description of the Data 5000—a direct entry computing system	262
<b>FICS—forecasting and inventory control system</b> a suite of programs developed by Honeywell for stock control applications	269
<b>Data processing topics</b> comments on new equipment and applications	272
<b>Transmitting data in a marshalling yard</b> equipment supplied by Addo Limited forms the basis of an inexpensive communications system	282
<b>A computer in the mail order business</b> procedures adopted by Freemans Limited	286
<b>Univac 9200 and 9300</b> two low-cost computers for the commercial user	294

## NUMBER 6      NOVEMBER-DECEMBER

<b>A desk-sized computer for the commercial user</b> new equipment from Litton Business Systems	304
<b>APT—New System</b> a programming language which facilitates the production of control tapes for machine tools	309
<b>Retrieving legal information</b> the feasibility of using computers to retrieve legal data is the subject of current research	314
<b>Magnetic ledger systems</b> introducing electronic data processing to the smaller user	318
<b>Pert/Cost—a planning technique for higher management</b>	323
<b>Data processing topics</b> comments on new equipment and applications	328
<b>Stock control for the retail clothing trade</b> a Burroughs computer is used by Moss Bros	338
<b>Computer costing for printers</b> a new service to help printing firms control costs	344
<b>High speed information display system</b> description of the DIDS-400 equipment developed by Raytheon	352
<b>A computer for Cornwall</b> how a local authority makes use of an I.C.T. 1902	356



# SUBJECT INDEX

## A

Accounting machines 24, 31, 140, 244, 289, 319  
 Addo Limited 282  
 Addo-X machine 282  
 Adrema Limited 337  
 Adrema Limited, Farrington Division 274  
 A.E.C. Limited 124  
 A.E.I. Electronics Limited 215  
 Alacra Limited 103  
 Almex ticket machine 222  
 An electronic accounting machine from Remington Rand 140  
 Applicazioni Chimicha Societa per Azioni (ACSA) 109  
 APT—New System 309  
 Arch 101 direct digital controller 82  
 Arch 9000 computer 84  
 ASP (Attached Support Processor) 328  
 Assembly languages; see Programming aids  
 Assets Computer Services Limited 32  
 Atlas computer 74  
 Atlas General Survey Program 74  
 Authors:  
   Beaven, A. H. 137  
   Beckley, Dudley F. 194, 318  
   Biggins, S. A. 309  
   Dagnall, B. D. 2  
   Fletcher, Allan 269  
   Goldberg, H. I. 202  
   Grinyer, Peter H. 250, 323  
   Harding, G. G. 220  
   Hoskyns, John 232  
   Liebman, L. 64  
   Millership, Dr. R. 78  
   Murphy, B. M. 12  
   Nathan, Russell V. 176  
   Saalmans, P. D. 220  
   Tapper, Colin 314  
   Tatham, Laura 6, 99, 338  
   Thomas, E. J. 124  
 Automated Industrial Management System (AIMS) 147  
 Automatic labelling machine 337  
 Automatic letter sorting 215  
 Automatically Programmed Tools (APT) 309, 334

## B

Banks, encoders for 104  
 Barro Computer Services Limited 152

Beaven, A. H. Author 137  
 Beckley, Dudley F. Author 194, 318  
 Bell Dataphone transmission system 65  
 Big business for a small installation 134  
 Biggins, S. A. Author 309  
 Billing 24, 140, 286  
 Bowe 216 automatic punched card separator 103  
 Bradma and the banks 147  
 British Aircraft Corporation 102  
 British Computer Society 210  
 British Federation of Master Printers 344  
 British Olivetti Limited 244  
 British Rail, computer techniques for 102  
 British Railways 282  
 Brookgreen Launderers and Dry Cleaners Limited 6  
 Bureau with a difference 207  
 Burroughs B.363 computer 339  
 Burroughs B.383 computer 207  
 Burroughs E2000 Series 31  
 Burroughs Machines Limited 31  
 Business Mechanisation Limited 24, 335  
 Business Operations Research Limited (B.O.R.) 220

## C

Caius College, Cambridge 109  
 Calcomp 566 digital plotter 274  
 Cambridge Computer Services 109  
 Cambridge Consultants Limited 103  
 Capturing data 55  
 Carter-Parratt Limited 156  
 Centre for Computing and Automation 273  
 Check digit verification 194  
 Ci-5000 computer 210  
 Clearing half a million cheques a day 54  
 Commercial user, a desk-sized computer for the 304  
 Compagnie Bull-General Electric 112  
 Compagnie Européenne d'Automatisme Electronique (C.A.E.) 23  
 Compatibles/400 series 110  
 Computers:  
   Arch 9000 84  
   Atlas 74  
   Burroughs B.363 339  
   Burroughs B.383 207

Ci-5000 210  
 Compatibles/400 series 110  
 Data 5000 (Siemag) 262  
 EELM System 4 276, 331  
 Elliott 803 79, 226  
 Elliott 903 34, 237, 272  
 Elliott 920B 236  
 Elliott 920M 241  
 GE-412 231  
 Honeywell 200 271  
 Honeywell-400 344  
 IBM 1401 54, 67  
 IBM 1410 110  
 IBM 1620 274  
 IBM 7010 62  
 IBM 7090 5  
 IBM 7094 67  
 I.C.T. 1301 91  
 I.C.T. 1900 series 34, 44, 279  
 I.C.T. 1901 337  
 I.C.T. 1902 357  
 I.S.C. Series 90 23  
 Leo 326 286  
 Model 1210 (Litton) 304  
 NCR 315 128  
 NCR 390 320  
 NCR Series 500 321  
 NCR Elliott 803 7  
 NCR Elliott 4100 139  
 RCA 301 191  
 Siemag Data 5000 262  
 Sigma 7 146  
 System 4 (EELM) 276, 331  
 Telefunken TR440 108  
 Univac 418 166  
 Univac 490 184  
 Univac 1108 II 153  
 Univac 9200 294  
 Univac 9300 294  
 Computer Analysts and Programmers Limited 210, 335  
 Computer assisted production control 124  
 Computer consultant, the role of 232  
 Computer control of a blood bank 64  
 Computed controlled display system 260  
 Computer costing for printers 344  
 Computer for Cornwall 356  
 Computer for the company that cares 6  
 Computer in the mail order business 286  
 Computer Projects Limited 152  
 Computer Resale Brokers Limited 30, 277, 336  
 Computer service bureaux 32, 152, 207, 330, 333

Computer-systems advisory service 103  
 Computer Weekly 275  
 Computers and Government 12  
 Computing Laboratory of Newcastle University 218  
 Conversations with computers 337  
 Cope, Charles E. group of companies 134  
 Cornwall, a computer for 356  
 Cornwall County Council 356  
 Cossor-Raytheon DIDS-400 System 352  
 Cost analysis on punched cards 14  
 Costing for printers by computer 344  
 Costing for surveyor's department 358  
 Cram storage units 131  
 CRB Incorporated 277  
 Creed 75 teleprinter 11  
 Creed verifier 229  
 Crosfield Electronics Limited 273

## D

Dagnall, B. D. Author 2  
 Data Dynamics Limited 328  
 Data 5000 computer (Siemag) 262  
 Data links 218  
 DataSolve Limited 330  
 Data Systems Division of Standard Telephones & Cables Limited 217  
 De La Rue Bull Limited 112  
 Desk-sized computer for the commercial user 304  
 DIDS-400 system 352  
 Direct digital control (d.d.c.) 82  
 Disc stores for IBM and I.C.T. computers 336  
 Display system, computer controlled 260  
 Display systems 260, 352  
 d-mac Limited 215  
 Dura Mach 10 tape controlled typewriter 337

## E

E-13B character code 55, 104  
 Eastern Europe, trade with 144  
 EELM System 4 computers 276, 331  
 Efficient way to handle output data—microfilm 38  
 Electronic accounting machine, Remington Rand 140  
 Elliott 803 computer 79, 226  
 Elliott 900 series 232  
 Elliott 903 computer 34, 237, 272  
 Elliott 920B computer 236  
 Elliott 920M computer 241  
 Elliott-Automation Limited 236  
 Elliott Traffic Automation 102  
 English Electric-Leo-Marconi Computers Limited 99, 276, 309  
 Enquiry handling (stockmarket) 170  
 Esso Petroleum Limited 2

## F

Farrington Optical Page Reader 274  
 Fastrand magnetic drum 170, 190  
 Fawley Refinery 2  
 FICS—forecasting and inventory control system 269  
 Fletcher, Allan, Author 269  
 Fletcher Computer Services Limited 33  
 Flowers Committee 100  
 Fluid logic 281  
 Forecasting and inventory control system—FICS 269  
 Forms handling equipment 211  
 Freemans Limited 287  
 Friden Collectadata equipment 102  
 Friden Flexowriter 64, 157, 227  
 Friden Teledata equipment 65

## G

G.E.C. Computers and Automation Limited 146  
 GE-412 computer 231  
 General Electric Company Limited 23  
 General Precision Systems Limited 14, 109  
 German computer for the British market 262  
 Goldberg, H. I. Author 202  
 Government and computers 12, 28, 100  
 Grinyer, Peter H. Author 250, 323  
 Growing demand for used computers 277

## H

Half a million cheques a day, clearing 54  
 Harding, G. G. Author 220  
 High speed information display system 352  
 Hire purchase accounting at Southern Gas 90  
 Hoare & Company 274  
 Honeywell computer bureaux 33  
 Honeywell Controls Limited 269  
 Honeywell 200 computer 271  
 Honeywell-400 computer 344  
 Hoskyns, John, Author 232  
 Hoskyns, John, and Company Limited 275

## I

IBM 1001 terminal 189  
 IBM 1050 terminal 188  
 IBM 1401 computer 54, 67  
 IBM 1410 computer 110  
 IBM 1419 reader-sorter 57  
 IBM 1620 computer 274  
 IBM 7010 computer 62  
 IBM 7090 computer 5  
 IBM 7094 computer 67

I.C.T. Computing Service Centres 334  
 I.C.T. 40-column punched card system 134  
 I.C.T. 80-column punched card system 16  
 I.C.T. 1004 data processor 154, 166  
 I.C.T. 1301 computer 91  
 I.C.T. 1900 series computers 34, 44, 279  
 I.C.T. 1901 computer 337  
 I.C.T. 1902 computer 357  
 I.C.T. data processing packages 277  
 I.C.T. peripheral equipment 30  
 I.C.T. Research and Development Laboratories 88, 281  
 Illinois Institute of Technology Research Institute (IITRI) 109, 310, 334  
 Imperial College 273  
 Incedata Limited (International Civil Engineering Data Association) 31  
 Industrial and commercial simulation 2  
 Industrial automation, new computers for 23  
 Information Displays Incorporated 260  
 Information retrieval 41, 218, 314  
 Instant information for the investor 164  
 Institute of Practitioners in Advertising 108, 210  
 Integrated control in the process industries 78  
 Integrated data processing systems 176  
 Inter-Loc—a real time management control system 184  
 International Computers and Tabulators Limited 44, 74, 108, 259, 276  
 International Federation of Automatic Control (third congress) 101  
 International Systems Control Limited (I.S.C.) 23  
 International Telephone and Telegraph Corporation (ITT) 333  
 Intinco Limited 165  
 Inventory Management Program and Control Techniques (IMPACT) 146  
 Investor, instant information for 164  
 Investment and Mortgage Program System (IMPS) 147  
 Invoicing 24, 140, 286  
 I.S.C. Series 90 computer 23

## L

Language H 137  
 Laporte Chemicals, order handling at 154  
 Legal information, retrieval of 314  
 Leo 326 computer 286  
 Lieberman, L. Author 64  
 Litton Business Systems Limited 304  
 Lockheed-Georgia Company 184  
 Lockheed Missile and Space Company 64  
 "Lodestar" reader-printer 42  
 Logabax Limited 262

## M

Magnetic cards 244  
 Magnetic ledger cards 263, 322  
 Magnetic ledger systems 318  
 Mail order business, a computer in the 286  
 Management Computing Services Limited 344  
 Management Dynamics Limited 145  
 Marconi-Ferranti licence agreement 101  
 Marshalling yard, transmitting data in 282  
 MEDLARS (Medical Literature Analysis and Retrieval System) 218  
 Metropole Computer Services 152  
 Microfilm—the efficient way to handle output data 38  
 Microfilming system, Crosfield 273  
 Millership, Dr. R. Author 78  
 Miniputer 140  
 Ministry of Technology, The 28  
 Miracode system 42  
 Mobile computer classroom 34  
 Model 1210 computer (Litton) 304  
 Modulus 11 194  
 Monolithic integrated circuits 295  
 MOP—multiple on-line programming system 202  
 Moss Bros. Limited 338  
 Multi-access computer systems 276  
 Multiple on-line programming system (MOP) 202  
 Murphy, B. M. Author 12

## N

Name and address problem, solving the 109  
 Nathan, Russell V. Author 176  
 National Aeronautics and Space Administration (NASA) 250  
 National Cash Register Company Limited 137  
 National Lending Library for Science and Technology 218  
 NCR 315 computer 128  
 NCR 390 computer 320  
 NCR 411 check digit verifier 197  
 NCR 411 keyboard machine 8  
 NCR Series 500 computer 321  
 NCR computer bureaux 33  
 NCR Elliott 803 computer 7  
 NCR Elliott 4100 computer 139  
 NCR Elliott Computer Workshops Limited 333  
 NCR Post-tronic accounting machine 318  
 New computers for industrial automation 23  
 New language from IIT 109  
 New solution to an old problem 220  
 New System—APT 309  
 Newspaper, Computer Weekly 275  
 Numerical control 215, 309, 334

## O

O.D.P. equipment 95  
 Olivetti audit accounting machine 289

Olivetti Programma 101 244  
 On-line computer control systems 149  
 Operational research in the ship-building industry 144  
 Optical character reader/sorter (SEL) 217  
 Optical page reader (Farrington) 274  
 Order handling at Laporte Chemicals 154  
 Order scheduling and control in the steel industry 225

## P

Pert/Cost a planning technique for higher management Part 1 250  
 Part 2 323  
 Preparing more invoices at less cost 24  
 Process industries, integrated control in the 78  
 Production control 180  
 Production control, computer assisted 124  
 Programma 101 244  
 Programming aids (Software) 244  
 APT 309, 344  
 Atlas General Survey Program 74  
 Cobol 118, 300  
 Extended Mercury Autocode 223  
 Forecasting and inventory control system (FICS) 269  
 Fortran 223  
 Fortran IV 118, 300  
 Fortran V 329  
 Gangpunch Reproducer Generator 300  
 GE-400 macro assembly language 118  
 I.D.S. 118  
 IITRAN 109  
 Language H 137  
 Mathpac 302  
 MOP 202  
 Nicol 53  
 Plan 47, 53  
 RPG (Report Program Generator) 298, 300  
 SIR 240  
 Programming service from I.C.T. 217  
 Punched cards, cost analysis on 14

## R

Randax-E.D.P. Limited 33, 207  
 Raytheon Company, The 352  
 RCA 301 computer 191  
 Reader's Digest Association 110  
 Reading computer input data automatically 259  
 Real time computer systems 164, 184  
 Real time management control system—Inter-Loc 184

Recordak "Miracode" system 38  
 Redifon-Astrodata Limited 210  
 Reliability assessed by computer 88  
 Remington Rand Limited 140  
 Remote Access Computing System (RACS) 328  
 Retail clothing trade, stock control in the 338  
 Retrieving legal information 314  
 Richard Thomas and Baldwins Limited 87, 225  
 Role of the computer consultant, The 232  
 Royal Liberty School, Romford 272

## S

Saalmans, P. D. Author 220  
 Sadie keyboard accounting machine 25, 335  
 Sales statistics 293, 342  
 S-C 4400 document recorder 38  
 SCAN (Stockmarket Computer Answering Network) 164  
 SCAN (Stock control and analysis on 1900) 329  
 Scientific Data Systems Corporation 23  
 Second-hand computer market 30  
 Service bureaux 32, 152, 207, 330, 333  
 Siemag Data 5000 computer 262  
 Siemag Feinmechanische Werke GmbH 262  
 SIGMA (Science in General Management Limited) 144  
 Sigma 7 computer 146  
 Simulation, industrial and commercial 2  
 Small installation, big business for 134  
 Software, see Programming aids  
 Software development 147, 328  
 Software Survey series 69, 74, 137, 202, 269, 309  
 Software, what is? 69  
 Solving the name and address problem 109  
 Southern Gas, hire purchase accounting at 90  
 Spectra 70/568-11 mass storage unit 212  
 Spencer Works, Richard Thomas and Baldwins Limited 225  
 Staffordshire College of Technology 99  
 Standard Elektrik Lorenz (SEL) 217, 268  
 Standard Telephones and Cables Limited Service Bureau 152  
 S.T.C. 6300 ADX communication system 217  
 Steel industry, control and order scheduling in the 225  
 Stock control 286, 338  
 Stock control in the retail clothing trade 338  
 Stromberg-Carlson Division of General Dynamics 39, 337  
 Sub-nanosecond circuits 145  
 Surveyor's department, costing for 358



Susie keyboard accounting machine  
26, 335  
Systemation Limited 24

## T

Tapper, Colin. Author 314  
Tatham, Laura. Author 6, 99, 338  
Telefunken TR440 computer 108  
Teletype Model 35 terminal 186  
Television Audience Measurement  
(TAM) 108  
Thomas, E. J. Author 124  
Tickopres Limited 337  
Tinsley marshall yard 282  
Toward integration 176  
Training tomorrow's experts 99  
Transmitting data in a marshall  
yard 282

## U

Univac 418 computer 166  
Univac 490 computer 184  
Univac 880FH (flying head) drum  
186  
Univac 1001 card controller 300  
Univac 1108 II computer 153  
Univac 9000 Series 294  
Univac 9200 computer 294  
Univac 9300 computer 294  
Univac Division of Remington Rand  
Limited 153  
Universal Document Transport 259  
University of London Atlas Com-  
puting Service 33  
Urwick Orr and Partners 32  
U.S. Department of Defence 250  
U.S. General Electric 112

## V

VISA (Variable Incident Simulation  
Apparatus) 32  
Visirecord cards 156

## W

Wallasey Corporation Passenger  
Transport Department 220  
Waterlow Automation Services  
Limited 145  
Watford Computer Centre Limited  
334  
Westminster Bank Limited 54  
What is Software? 69  
Wilkes James, Limited 211



